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मानक

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IS 13808-5 (1996): Quality management for hospital services (upto 30 bedded hospitals) Guidelines, Part 5: Hospital Equipment Management [MHD 14: Hospital Planning]



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“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक

अस्पताल सेवाओं के लिए गुणता प्रबन्ध
(30-संसतरित अस्पताल के लिए) —
मार्गदर्शी सिद्धान्त

भाग 5 अस्पताल उपस्कर प्रबन्ध

Indian Standard

QUALITY MANAGEMENT FOR HOSPITAL
SERVICES (FOR 30-BEDDED HOSPITAL) —
GUIDELINES

PART 5 HOSPITAL EQUIPMENT MANAGEMENT

ICS 11.020;11.140

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NEW DELHI 110002

FOREWORD

This Indian Standard (Part 5) was adopted by the Bureau of Indian Standards, after the draft finalized by the Hospital and Medical Care Services Sectional Committee had been approved by the Management and Systems Division Council.

Need has been felt for establishing quality management and quality assurance procedures in hospital services so as to make the same more effective, economical and accountable. Once a health and medical care facility has been planned and equipped, there is a need to manage it scientifically so that quality service is provided to patients on a continued basis. While basic management principles and individual skills are helpful in such efforts, optimum results can be achieved only if certain standards and guidelines are available for the management and operational systems of health and medical care services. For this purpose, it is necessary, as a first step, to lay down norms and standards and then to provide the requisite infrastructure needed for achieving the desired targets.

The diverse nature and variety of equipment in a hospital may vary from a simple B. P. Apparatus to highly sophisticated diagnostic equipment and therapeutic gadgets. To ensure efficient management of these equipment, it is important that a written plan or a guideline be developed for effective monitoring at various stages, right from procurement up to the disposal of equipment. This bears importance especially when these equipment are based on sophisticated and high cost technology involving huge funds from constrained resources. Further, the plan should endeavour to incorporate facilities for training in equipment management including equipment audit, maintenance and repairs for technicians and other paramedical personnel which form a vital link in the quality management system with respect to hospital equipment.

This Part of the standard provides basic guidelines for evolving a well planned programme for equipment management in a 30-bedded hospital which would result in quality health care to the patients. Other parts of this standard are as follows:

Quality management for hospital services (for 30-bedded hospital) — Guidelines

- Part 1 OPD and emergency services
- Part 2 Diagnostic and blood transfusion services
- Part 3 Wards, nursing services and operation theatre
- Part 4 Hospital support services

This standard is mainly for 30-bedded general hospitals such as community health centres/sub-district hospitals/intermediate hospitals and covers only a part of the quality management aspect in hospital services relating to infrastructure, skills, procedures and systems, etc, which is a prescription type provision, adherence to which is expected to result in services of desired quality. The other part, comprising of identification of attributes of quality and quantifying them, that is, performance type of standards for hospital services would be published in due course.

This standard has been prepared keeping in view the minimum resources available with respect to functional requirements, such as, space; manpower; instruments and equipment; and building requirements for 30-bedded hospitals in accordance with IS 12433 (Part 1) : 1989.

The Committee responsible for formulation of this standard is given at Annex D.

Indian Standard

QUALITY MANAGEMENT FOR HOSPITAL SERVICES (FOR 30-BEDDED HOSPITAL) — GUIDELINES

PART 5 HOSPITAL EQUIPMENT MANAGEMENT

1 SCOPE

This standard prescribes guidelines for establishing a system for hospital equipment management in a 30-bedded general hospital, which include:

- a) procurement; utilization; equipment audit; maintenance and repairs; condemnation and disposal practices; and
- b) training of technicians and other paramedical personnel.

2 REFERENCES

The Indian Standard IS 12433 (Part 1) : 1988 'Basic requirements for hospital planning : Part 1 up to 30-bedded hospitals' is a necessary adjunct to this standard.

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Breakdown

Failure resulting in the non-availability of an item.

3.2 Commissioning

Advancement of an installation from the stage of static completion to full working order and achievement of the specified operational requirements.

3.3 Corrective Maintenance

The maintenance carried out after fault recognition and intended to put an item into a state in which it can perform a required function.

3.4 Disposal

The act of getting rid of an unwanted item by means of sale or otherwise.

3.5 Down State

A state of an item characterized either by a fault, or by a possible inability to perform a required function during preventive maintenance.

3.6 Down Time

The time interval during which an item is in a down state.

3.7 Economic Repair

A repair that will restore the product to sound condition at a cost less than the value of its estimated remaining useful life.

3.8 Equipment Audit

A retrospective evaluation of quality of performance of equipments in a hospital by an Equipment Audit Committee based on documented records of the equipment at the time of purchase and its subsequent maintenance.

3.9 History Sheet

A history record that is used for the purpose of maintenance planning.

3.10 Installation

Initial setup, adjustment and check-out of a product in 'the user's' environment.

3.11 Inventory

Inventory refers to the stock in hand at a given point of time and is meant to list out the assets of the hospital, both consumable and non-consumable items.

3.12 Inventory Control

A functional activity the objective of which is to minimize the total costs of maintaining inventories and of acquiring them in order to render the stipulated level of service. This term is also referred to as stock control.

3.13 Maintenance

The combination of all technical and administrative actions, including supervision actions, intended to retain an item in, or restore it to, a state in which it can perform a required function.

3.14 Obsolescent

Becoming, or about to become obsolete, out of date.

3.15 Obsolete

An adjective indicating that an item is no longer being manufactured or supplied.

NOTE — The reason may be that it is no longer required or that it has been superseded through technological advances.

3.16 Planned Maintenance

The maintenance organized and carried out with forethought, control and the use of records to a predetermined plan.

NOTE — Preventive maintenance is always part of planned maintenance; corrective maintenance may or may not be.

3.17 Preventive Maintenance

The maintenance carried out at predetermined intervals or according to prescribed criteria and intended to reduce the probability or failure of the degradation of functioning of an item.

3.18 Procurement

The process of obtaining goods, materials and services from an internal or external supplier. This process includes the managerial, technical, contractual and physical actions required to control the availability and ordering of such requirements.

3.19 Redundant

Capable of performing a required function by more than one means.

3.20 Repair

That part of corrective maintenance in which manual actions are performed on the item.

3.21 Salvage Value

The amount that can be realized by the disposal of the asset.

3.22 Scrap

Items or material discarded as being incapable of being rectified or salvaged.

3.23 Service Contract

Contract calling directly for a contractor's time and effort rather than for a specific end product.

3.24 Tender

An offer, normally in writing, to supply a commodity or to execute works, giving price and compliance with the specification.

3.25 Up State

A state of an item characterized by the fact that it

can perform a required function, assuming that the external resources, if required, are provided.

NOTE — This state relates to availability performance.

3.26 Up Time

The time interval during which an item is in an up state.

3.27 Utilization/Capacity Utilization

The actual usage of a resource compared with the maximum possible whilst it is available for use during a given period.

3.28 Warranty

Guarantee that an item will perform as specified for at least a specified time.

4 PLANNING

4.1 Physical Facilities

4.1.1 Instrument and Equipment Requirements

Instruments and equipments in a 30-bedded hospital may be classified into three main categories as given below:

- a) Medical and diagnostic equipment and instruments;
- b) Supportive instruments and equipments (including equipment required for kitchen, laundry, etc); and
- c) Furniture and furnishings.

Reference may be made to 9 of IS 12433 (Part 1) : 1988 for instrument and equipment requirements of various departments in a 30-bedded hospital.

4.1.2 Functional and Space Requirements

A separate cell may be provided for maintenance of equipment mentioned in 4.1.1. Adequate space should be ear-marked for this 'maintenance cell' at a convenient location out of the space provided for hospital engineering services department according to 7 of IS 12433 (Part 1) : 1988.

4.1.3 Manpower Requirements

The maintenance cell should be provided with electrical/mechanical technologists and engineering aids who would be responsible for maintenance and repair work of all the biomedical and other equipment of the hospital. Reference may be made to 8 of IS 12433 (Part 1) : 1988 for the specified requirements of manpower which may be shared with those of hospital engineering services.

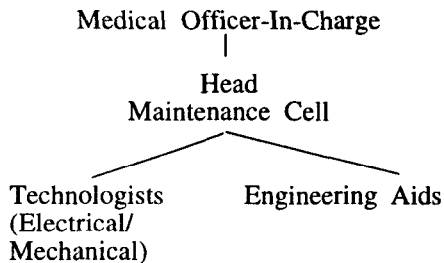
4.2 Expected Work Load

The expected work load for a 30-bedded general

hospital is estimated as 150 to 180 out-patients per day and 80 to 90 percent bed occupancy of the inpatients. Depending upon this load of outpatients and inpatients as well as the patient load in emergency, OT and other areas, it is expected that the variety of equipment would be optimally utilized.

5 ORGANIZATION STRUCTURE

5.1 The organization structure for equipment management for 30-bedded general hospital may be as given in the flow diagram below:



(To be shared with the engineering staff)

5.2 The staff working in the maintenance cell would be integral part of the hospital engineering services which is under the direct supervision of the designated medical officer-in-charge.

6 FUNCTIONAL MANAGEMENT

In order to provide efficient maintenance services in hospitals, a routine plan and guidelines should be developed. This plan should focus attention on the various elements related to procurement and maintenance of hospital equipment in order to optimize and get the best out of the limited amount of money and other scarce resources. Various elements involved in equipment management are covered in 7 to 14.

7 PROCUREMENT

7.1 General

Purchase of product and services may be critical to quality, cost, efficiency and safety of hospital services. Procurement of product and services should be given the same level of planning, control and verification as the other internal activities. Procurement of equipment should be based on scientific principles of materials management rather than on the instinct and experience alone. Some of the important aspect involved are given in 7.2 and 7.3.

7.2 Planning for Procurement

7.2.1 Assessment of Need

Need of the equipment should be assessed based on the services rendered and the workload of the hospital. Further, the need should be projected in a formal manner giving full details in the form of Certificate of Need (CON).

7.2.2 Use Coefficient

Use coefficient is applied to assess the utilization of an equipment from past experience, that is, whether the equipment is optimally utilized or under utilized. It can be measured by the following formula:

$$\text{Use coefficient} = \frac{N}{M} \times 100$$

where

N = average number of hours the equipment is used per day, and

M = maximum number of hours the equipment can be used per day.

NOTE — If the use coefficient is less than 50 percent, it is considered to be under utilized and hence a bad investment.

Use coefficient is useful for planning the procurement of additional equipment. However, life saving equipment and basic and essential equipment cannot be subjected to this kind of assessment.

7.2.3 Financial Effect

Planning of equipment mainly depends on the resource availability. However, cost consciousness should also be kept in mind while planning and procuring the equipment.

7.2.4 Equipment Specifications

The exact specifications including technical details of the equipment should be well defined after in-depth study of the equipment required.

7.3 Procurement Procedure

7.3.1 Selection of Vendors and Registration of Firms

Vendors should be selected after detailed market survey. List of vendors can be divided into the following heads:

- Local vendors
- Foreign vendors (in Rupees purchase)

The hospitals should maintain a register of firms and periodically review the same for additional firms and deletion of the black listed firms.

The firms should be registered through advertisement in all important newspapers/journals inviting applications from the desirous firms/suppliers. The suppliers should be asked to apply in the prescribed format including the following details:

- Name and address of the firm including telephone, telex, etc;
- Name of the proprietor(s) with adequate proof;
- In case of a limited firm, date of registration and the name of the director's;

- Whether on the approved list of any other organization and if so, full name and complete address to be given; and
- Details of items/equipment manufactured or supplied by the firm.

The applications received in response should be scrutinized by the purchase section of the hospital and the firm should be registered keeping in mind the criteria given in Annex A.

7.3.2 Formulating Tender Inquiry and Inviting Tenders

For purchase of equipment whose total cost is below Rs 10 000, quotations should be invited from registered firms. The tender inquiry complete in all respects may be issued to the suppliers by registered post. The firms to whom tenders are issued should have approval of the competent authority.

The details of the tender inquiry should indicate number of aspects, such as:

- i) Details of the items required;
- ii) Quantity required;
- iii) Specifications;
- iv) Name of the consignee;
- v) Destination at which equipment is required (delivery address);
- vi) Date by which required (delivery date);
- vii) Type of packing;
- viii) Warranty clause and guarantee against manufacturing defect;
- ix) Date and time of opening of tender;
- x) Requisition for literature (with picture, if any) on items being purchased;
- xi) Operating manuals and spare parts list for the equipment; and
- xii) Other terms and conditions of supply, if any.

Normally two to three weeks time would be allowed for submission of tender.

For high cost equipment (more than Rs 10 000), the notice for tender should be advertised in the leading newspapers/journals.

Advance information should be sent simultaneously to the registered firms/manufacturers.

Single tender inquiry may be adopted when the purchase committee is satisfied that no other firm is in a position to quote, for example, in case of strictly proprietary items.

7.3.2.1 Scrapping of tenders and issue of fresh inquiry

Re-invitation of tenders should be done only exceptionally and can be justified only where there

has been a material change in the basic specification after receipt of tenders or where the offers received do not conform to the specifications in important respects or where prices quoted are unreasonably high or because of sudden slump.

7.3.3 Finalization of the Order

The tenders should be processed and scrutinized and the order placed to the firm who fulfills all the requisite criteria for specifications.

7.3.3.1 Repeat order

Repeat orders should be placed against the previous order recently placed but in any case not later than 12 months after the initial order was placed.

7.3.4 Service Contract

After-sale service of an equipment is important to ensure continuous and uninterrupted functioning of the equipment. Service contract must be conceived and planned at the time of purchase. Salient features of the service contract should include:

- Regular service and maintenance for at least five years after the warranty period;
- Warranty with spares;
- Continuous supply of consumables — Some equipment may need expensive spares to be imported. Consumables must be secured to last for at least one year. Sufficient guarantee should be ensured for continuous supply of consumables, thereafter;
- Training of Staff — Training needs for the staff to handle the equipment efficiently should be identified and negotiated with supplier to provide necessary training to the staff free of charge before placing the order;
- After-sale service should be:
 - prompt;
 - reliable;
 - courteous so that there is minimum equipment downtime;
 - daily and round the clock;
 - supplier should also provide emergency service telephone number; and
 - The supplier should respond to the service call within 48 hours. If it fails to do so, the hospital will have the right to get it repaired on its own and the payment liability alongwith the penalty would be borne by the supplier.

7.3.5 Reception and Inspection

The equipment should be supplied by the firm as

per the details given in the supply order on receipt of the order. At the indicated location, the hospital management should identify the person(s) to receive and inspect the equipment as per the details given in the supply order.

7.3.6 Installation and Commission

The hospital management should ensure that the equipment is installed and commissioned within the time frame specified in the supply order considering the full specifications of the equipment notified therein.

On satisfactory receipt, installation and commissioning of the equipment, certificate to that effect should be given by the user department. The payment to the supplier should be made only on production of such a certificate.

8 UTILIZATION

8.1 General

Utilization essentially means the use of the equipment to its full potential. It should be the endeavour of the management to optimise the equipment utilization to obtain maximum return for the capital invested. Proper utilization of the hospital equipment will lead to:

- Optimal patient handling and rapid turnover,
- Minimum possible cost, and
- Quality patient care and satisfaction.

8.2 Important Factors Affecting Utilization of Equipment

8.2.1 Training of the Staff

Timely and appropriate training of the staff handling and operating the equipment is a pre-requisite for effective and optimum utilization of equipment (*see also 12*).

8.2.2 Equipment Installed on Turn Key Basis

Costly equipment installed on turn key basis may be found to have better utilization as total equipment planning, considering all factors like civil, electrical, air-conditioning, installation, etc, are ensured. Thus the equipment when handed over to the hospital is normally fully functional.

8.2.3 Preventive Maintenance and After-Sale Service

Insisting on regular after-sales service of the equipment and a proper system of preventive maintenance, downtime of costly and essential equipment can be considerably reduced, thereby increasing utilization (*see also 9.1*).

8.2.4 Facility for Backup Power Supply

As most of the essential equipment run on electricity or chargeable battery supply, facility for power supply should be ensured. Some arrangements should be

made in the form of standby generators or if possible uninterrupted power supply (UPS) system.

8.2.5 Use Coefficient — See 7.2.2.

8.2.6 Awareness of Facilities

To ensure optimum utilization, a marketing strategy should be evolved where services can be made known to the community to gain maximum benefit of the capital invested.

8.2.7 Utilization of Special Facility or Skill

Costly equipment like X-ray, ultra-sound, etc, if under utilized, can be shared with other hospitals to ensure optimum utilization.

9 MAINTENANCE AND REPAIRS

9.1 General

The equipment maintenance and repairs would include the following:

- i) Preventive maintenance,
- ii) Master maintenance plan, and
- iii) Repair of equipment.

9.2 Preventive Maintenance

9.2.1 For the preventive maintenance of all expensive and sophisticated equipment, care should be taken that the new equipment/machines are under warranty for a sufficient period to test its performance. The essential spares and consumables should be obtained alongwith the equipment as a part of the configuration and the integral part of the purchase contract, to last for sufficiently long period. The equipment should also be under service contract for at least 5 years. The company should undertake to service the equipment after five years also. Some penalty clause may be included in the purchase contract to this effect. For electronic equipment necessary safeguards should be carefully observed which may include:

- Voltage stabilizers, built-in or otherwise;
- In high priority areas like operation theatre, diagnostic services department, etc, voltage stabilization should be done area-wise preferably through a UPS system;
- Separate line should be laid where voltage fluctuation is considerable; and
- Automatic switch-over for emergency should be provided with a generator.

The requirements of electricity, space and atmospheric conditions should also be taken into account. For example, for certain life saving equipment, a three-phase supply of electricity should be provided and the space available should provide feasibility for extension in future. Such equipment should also be protected from the vagaries of weather in order to minimize the breakdown and also enhance the life of equipment.

9.2.2 For the routine equipment/instruments, such as, Sphygmomanometer, suction apparatus, centrifuges, incubator, hot-air ovens, ECG machine, etc, the maintenance cell should have the required facilities in terms of skilled and trained manpower, adequate spares and infrastructural facilities.

9.2.3 It is important that the persons handling the equipment should strictly adhere to the instructions of its operational manual for its day to day functioning.

9.3 Master Maintenance Plan

The master maintenance plan for future should be drawn in consideration of the load of the user department including the following aspects of equipment maintenance and repairs:

- Recruitment of skilled manpower,
- Arranging regular training programmes on maintenance and repairs of equipment for the technicians and other concerned personnel,
- Establishing a bank of spare parts and crucial components,
- Establishing detailed records of the purchase, procurement and maintenance of equipment,
- Periodic checks and repairs,
- Monitoring of the annual maintenance contract for expensive and sophisticated equipment,
- Developing a 'maintenance cell' for maintenance and repair,
- Establishing a nucleus of communication between this cell and the supplier of equipment, and
- Follow up of the maintenance and repair services.

9.4 Repair of Equipment

9.4.1 It is necessary to have basic in-house facilities for the routine repairs of the common equipment. For example, they may be non-functional for want of simple repairs, such as faulty switches and plugs, loose wiring and sparking, fuse problems, lack of spare parts, lack of training in handling the sophisticated equipment (as well as regularly needed equipment), etc.

The in-house repair facility should be organized keeping the following in mind:

- Head of the maintenance cell should be completely accountable and responsible for the task under his control
- Availability of skilled manpower for the repairs
- Provision for a bank of spare parts and crucial components
- All technicians and other workers handling important equipment should be provided with a separate tool kit consisting of all essential items required for repairs and maintenance.

9.4.2 The repair procedures must underline the following:

- a) Repairing and servicing of sophisticated equipment only under the guidance of a skilled person.
- b) This cell should also evolve and develop the procedures for requisitioning repair services, as and when a particular equipment breaks-down or stops working.
- c) If in-house facilities cannot repair a particular equipment, then the procedure for its repair from outside agencies should also be developed.
- d) The downtime of each equipment should be specified and adhered to by the maintenance cell.
- e) The technical personnel involved should be trained either by established institutions or by the company supplying those equipment.

10 CONDEMNATION AND DISPOSAL

10.1 General

Every hospital must develop proper maintenance and repair facilities for hospital equipment in the manner suggested in 9, to minimize the periodic breakdowns as well as increase the uptime of the equipment to its maximum. However, certain non-functional equipment either become obsolete or beyond economic repair which occupy precious little space in the respective departments and in the hospital on the whole. These equipment need to be condemned and disposed off at regular intervals.

Regular and periodical condemnation of equipment should be undertaken and this procedure should not be withheld due to reasons such as those given below:

- a) Lack of adequate record and other details with respect to date of procurement, purchase cost, source, and cost incurred on maintenance, repair;
- b) The unwillingness and reluctancy on the part of the senior hospital authorities to take decision for condemnation and disposal of equipment.

It is essential that proper procedures should be laid down for condemnation and disposal of hospital equipment. It is also essential that proper records with respect to every expensive equipment should be maintained to facilitate their effective and efficient use, equipment audit and ultimately justify their condemnation and disposal.

10.2 Minimum criteria to be followed for condemnation and disposal of equipment may be as given below:

The equipment has become:

- a) Non-functional and beyond economical repair (other than single use or expiry date items),
- b) Non-functional and obsolete,
- c) Functional but obsolete,

- d) Functional but hazardous, and
- e) Functional but no longer required.

10.3 Procedure for Condemnation

Purchase and maintenance records of all costly and sophisticated equipment should be maintained in the form of a separate history sheet and log book for each equipment. The format and the contents of history sheet and log book are given in Annex B and C

Items like disposables and I/V sets, linen, patient cot, and related furniture items, bowels and trays, etc, can be condemned on the recommendation of the user department.

10.3.1 Condemnation Committee

A condemnation committee should be constituted for assessing whether or not an equipment should be condemned and disposed of based on the history sheet and the recommendations of the user department. This committee should meet periodically at regular intervals, at least twice a year. The condemnation committee may consist of:

- a) Designated medical officer-in-charge,
- b) Matron,
- c) Technologist in-charge of maintenance cell, and
- d) Stores-in-charge.

10.4 Procedure for Disposal

Any of the following procedures may be adopted for disposal of equipment after condemnation:

- a) Circulate within the hospitals, wards and OPD,
- b) Return to vendor if he is willing to accept,
- c) Sell to other hospitals,
- d) Sell to scrap dealers,
- e) Sell to hospital employees,
- f) Local destruction, and
- g) Auction.

11 EQUIPMENT AUDIT

11.1 General

At any given point of time, large percentage of equipment in many of the hospitals may be non-functional. Besides, no proper equipment purchase and maintenance records may be available. Most of the equipment may not be in usable conditions for want of minor repairs, lack of preventive maintenance, lack of essential spares and consumables, electrical faults, etc. Other important reasons for this gross equipment wastage may include:

- a) Mishandling of equipment;
- b) Untrained and unskilled manpower;
- c) Purchase of highly sophisticated equipment without competent personnel to handle the same; and

- d) Purchase of excess equipment without justifiable demand.

There should be an efficient system for monitoring the various involved in the form of carrying out 'Equipment Audit' that is, periodic evaluation of the quality of performance of equipment in a hospital to ensure better utilization of scarce resources.

11.2 The stages involved in equipment audit are given in 11.2.1 to 11.2.3.

11.2.1 Procurement

The steps involve the checking for:

- a) justification for the purchase of equipment including the technical specifications provided, with the help of indents received for the purpose from the user department;
- b) suitability of the specification in the supply order and the choice of supplier to whom the order has been placed through tenders floated and quotations received;
- c) receipt of equipment as per the specifications in the supply order; and
- d) ensuring availability of the essential spares and consumables, after sales maintenance service and the training to be provided by the supplier to the hospital staff for efficient use of the equipment, wherever required;

11.2.2 Installation and Commission

This involves checking with the help of history sheet whether the installation instructions namely, safety, electrical instructions, etc, have been followed.

11.2.3 Performance

The performance aspect of the equipment audit should be checked with the help of the history sheet (*see Annex B*) and log book (*see Annex C*). The user department itself should also review the history sheet and log book periodically.

11.3 Equipment Audit Committee

The equipment audit Committee may consist of medical-officer-in-charge, user department, head of maintenance cell and the matron. The equipment audit committee shall select its own Chairman and the Secretary among the members in the first meeting and then meet periodically, minimum once in six months, to perform equipment audit based on the history sheet of the equipment. Maintenance of history sheet and its subsequent write-up is sine-qua-non for performance of equipment audit by the committee.

11.4 Some of the advantages of equipment audit are as under:

- a) To evaluate the concurrent performance and utilization,
- b) It provides a satisfactory mechanism to assist the process of condemnation

- c) The equipment audit reports provide an objective method for procurement of equipment in future,
- d) To identify inadequacies and recommend remedial measures, and
- e) Cost per reportable result and cost effectiveness can be evaluated.

12 TRAINING AND DEVELOPMENT

12.1 General

Regular in-service training programmes should be developed and conducted for technicians and other paramedical personnel, engaged in the day to day operation of hospital equipment in various departments.

12.2 Training in hospital equipment can be broadly classified under the following categories:

- a) Training by the supplier of the equipment dealing with its operation,
- b) Training within the hospital dealing with routine maintenance/repairs, and
- c) Training outside the hospital in a recognized institution dealing with maintenance/repairs for electronic equipment.

12.3 Important elements in the training and development of the technicians include:

- a) Training the technicians in quality management;
- b) Education of technicians on the repair/maintenance policy, objectives and concepts of patient satisfaction;
- c) Awareness programmes for new entrants (Induction training programmes);
- d) Procedures for specifying and verifying that technicians received suitable training;
- e) Teamwork and communication methods;
- f) Assessing carefully the technicians requirements and subsequently providing assistance and encouragement; and
- g) The performance evaluation of technicians to assess their development needs and potential.

12.4 The training may be provided in different modules. Some of which may be of the following types:

- a) Use and practice of equipment including proper handling of the equipment;
- b) Preventive maintenance and trouble shooting;
- c) Following the instruction manual in day-to-day use of the equipment;
- d) Use of tool kit;
- e) Knowledge about common and recurrent causes of break-down;
- f) Identification of common spare parts which are responsible for frequent break-downs, such as, fuses, washers, nuts and bolts, etc;
- g) Inspection and routine maintenance — Daily/periodic check/servicing schedule with information on all aspects of inspection, removing, dismantling, cleaning, examining, lubricating, assembling, adjusting, testing and reassembling of equipment/system where required;
- h) Calibration;
- j) Testing and safety guidelines;
- k) Basic concepts of physics and electronics as relevant to hospital equipment; and
- m) Technology upgradation.

13 PROCEDURE MANUAL

A standard manual should be developed and followed with regard to each functional activity related to equipment management including training of technicians and other paramedical personnel.

14 PERFORMANCE EVALUATION

A suitable mechanism should be available with requisite infra-structural facilities for evaluating the performance of the maintenance cell and other departments relating to procurement, utilization, maintenance and repair, and condemnation and disposal of the equipment. The feedback arising out of such evaluation should be recorded and made use of in improving the quality related activities of equipment management in future.

ANNEX A

(Clause 7.3.1)

CRITERIA FOR REGISTRATION OF FIRMS

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| <ul style="list-style-type: none"> i) The firm should have been in business for a period of atleast three years in the country in relation to the type of equipment for which the registration is sought. ii) Number and date of the sale tax registration certificate, wherever applicable. iii) List of buyers to whom the supplier has supplied similar equipment in the last one to two years should be obtained to inquire | <ul style="list-style-type: none"> about the performance of the firm. iv) Registration of firms should preferably be done for manufacturers and should be renewed after every two years atleast. v) A proof of ownership should be obtained alongwith verification of address, telephone number, etc. vi) If the firm is not fulfilling the terms and conditions, it should be black listed. |
|--|--|

ANNEX B

(Clauses 10.3 and 11.2.3)

HISTORY SHEET*Sl No.*

- | | |
|---|---|
| i) Name of equipment | : |
| ii) Date of purchase | : |
| iii) Cost of equipment | : |
| iv) Name and address of supplier | : |
| v) Name of manufacturer | : |
| vi) Date of installation | : |
| vii) Department where installed | : |
| viii) Environmental control ¹⁾ | : |
| ix) Spare parts inventory and consumable | : |
| x) Technical manual/circuit diagrams/
literature | : |
| xi) After sale service arrangements | : |
| xii) Guarantee period | : |
| xiii) Warranty period | : |
| xiv) Life of equipment | : |
| xv) Depreciation per year | : |
| xvi) Charges of tests ²⁾ | : |
| xvii) Use coefficient ³⁾ | : |
| xviii) Down-time/up-time | : |
| xix) Cost of maintenance | : |
| xx) Date of condemnation | : |
| xxi) Date of replacement | : |

¹⁾ Proper environmental control in terms of temperature, lighting and ventilation should be ensured and recorded, wherever applicable.

²⁾ Wherever applicable, charges of tests shall be specified *viz-a-viz* the cost of reportable results.

³⁾ See 7.2.2.

ANNEX C
(Clauses 10.3 and 11.2.3)

LOG BOOK

Sl No.	Name of Equipment	Warranty Period	AMC No. & Validity Period	Date of Breakdown	Date of Repair	Expenditure Incurred	Details of Preventive Maintenance	Remarks
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ANNEX D*(Foreword)***COMMITTEE COMPOSITION****Hospital and Medical Care Services Sectional Committee, MSD 8***Chairman*

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